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Delayed Insemination of Non-Estrual Beef Heifers in 7-day CO-Synch Timed Artificial Insemination

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Abstract

Reproductive performance in cattle is considered to be the most economically important trait and is essential for the success of an operation. In the last decade, timed artificial insemination (AI) in the beef cattle industry has increased in popularity due to the decreased amount of labor required for estrous detection. To increase the use of AI; however, cost and time inputs need to be further decreased. The objective of this study was to determine if fertility could be improved in beef heifers that are not expressing estrus before timed AI by delaying insemination.

Keywords

fixed time artificial insemination, delayed insemination, estrus

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CATTLEMEN'S DAY 2016

Delayed Insemination of Non-Estrual Beef Heifers in 7-day CO-Synch Timed Artificial Insemination

D.C. Shaw, K.E. Fike, D.M. Grieger

Introduction

Reproductive performance in cattle is considered to be the most economically important trait and is essential for the success of an operation. In the last decade, timed artificial insemination (AI) in the beef cattle industry has increased in popularity due to the decreased amount of labor required for estrous detection. To increase the use of AI; however, cost and time inputs need to be further decreased. The objective of this study was to determine if fertility could be improved in beef heifers that are not expressing estrus before timed AI by delaying insemination.

Key words: fixed time artificial insemination, delayed insemination, estrus

Experimental Procedures

Estrus was synchronized using the 7-day CO-Synch+CIDR protocol across three locations of commercial and purebred beef heifers (n=465; Figure 1). Heifers were given gonadotropin-releasing hormone (GnRH, 2 mL, intramuscular; Cystorelin; Merial, Athens, GA) and an Eazi-Breed CIDR insert (1.38 g of progesterone; Pfizer Animal Health, Whitehouse Station, NJ) on day 0. The CIDR inserts were removed seven days later and the heifers received an injection of prostaglandin-$F_{2\alpha}$ (PGF, 5 mL, intramuscular; Lutalyse; Zoetis) and estrous detection patches (Estrotect; Rockway, Inc., Spring Valley, WI) were applied. All heifers were administered GnRH at 48 hours after PGF regardless of estrous expression. Estrus was defined as >50% of the gray rub-off coating on the Estrotect patch being removed exposing the red color underneath the gray coating. Estrous expression was determined at 48 hours after PGF. Timed AI occurred at 48 hours in all heifers displaying a red patch (Estrus; n=180). Heifers not displaying estrus (heifers with a gray patch) were randomly assigned to either insemination at 48 hours after PGF (gray patch; Non-Estrus; n=137) or delayed AI 56 to 58 hours after PGF (gray patch; Non-estrus delayed; n=148). Estrotect patches remained on all heifers that did not display estrus at 48 hours after PGF, and estrous expression of these heifers was recorded before delayed timed AI. Time of administration for PGF, GnRH, and AI were recorded for each location. Heifers were exposed to cleanup bulls for the remainder of the breeding season. At 30 days post timed AI, transrectal ultrasonography (5MHz transrectal transducer, Aloka 500V, Wallingford, CT) was used to

confirm pregnancy. Pregnancy to timed AI was determined by the presence of uterine fluid and an embryo.

Results and Discussion

Pregnancy rate to timed AI (Figure 2) was greatest ($P<0.05$) for heifers with a red patch and inseminated at 48 hours after PGF (Estrus, 67.8%) compared to heifers with a gray patch at 48 hours after PGF (Non-Estrus; 39.4%). For heifers not expressing estrus by 48 h after timed AI, the delayed insemination treatment did not result in a greater percent of pregnancies (42.6%; $P>0.05$).

Use of estrus-detection patches to determine estrous activity can improve management of reproductive performance in cattle. We observed in this study that heifers are more likely to become pregnant if estrus is expressed before timed AI.

Implications

Delaying insemination by eight hours in non-estrual beef heifers did not improve pregnancy rates. However, estrus-detection patches could be a valuable management tool for producers to improve efficiency of timed AI if they choose to inseminate only red-patch heifers 48 h after CIDR removal of the 7-day CO-synch timed AI protocol.

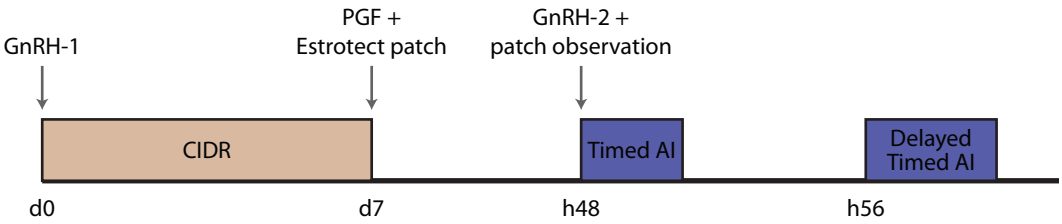

Figure 1. Experimental design.
CIDR = progesterone insert; PGF = prostaglandin $F_{2\alpha}$; Timed AI = time of insemination for heifers with red patches and half of the heifers with gray patches; Delayed Timed AI = time of insemination for remaining half of heifers with gray patches.

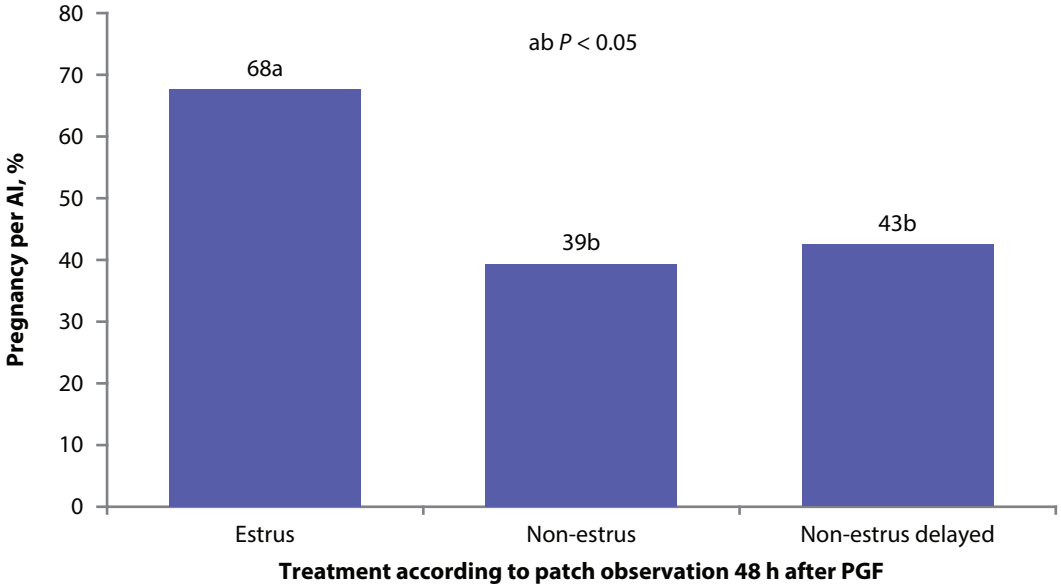

Figure 2. Pregnancy rates per timed AI.
The bars represent the percentage of heifers that became pregnant to timed AI within treatment. Estrus = red patch inseminated 48 hours post-PGF, Non-Estrus = gray patch inseminated 48 hours post-PGF, and Non-Estrus Delayed = gray patch inseminated 56 hours after PGF. Treatment mean percentages with uncommon letters differ (P<0.05).